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# Community Dynamics in an Online Law Journal

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## Abstract

Online communities are continuously evolving socio-technical systems. To provide them with better change management support, a systematic analysis of the norms that govern their evolution is required. In this paper, we present an approach that was used to analyze the community dynamics in an online law journal. Electronic journals in the legal domain are essential instruments in the validation and distribution of new legal knowledge. To ensure the high quality of these e-journals, the dynamics of the online communities in which the various journal stakeholders interact need to be well understood. We outline the evolution of one of the first successful legal e-journals: the Electronic Journal of Comparative Law. We describe the change management lessons learnt in practice and use these to illustrate our diagnostic approach for self-governance analysis in virtual communities.

## 1. Introduction

Academic journals play a key role in the validation of scientific knowledge, and thus are vital in enabling the scientific collaboration process. Electronic journals, at least in theory, can much increase the quality of the contents of research, the speed of both the production and the dissemination of ideas, and the outreach and impact these ideas are having (Harasim, 1993; Harrison and Stephen, 1996).

An online journal does not concern a loose aggregate of individuals who just happen to interact. Instead, there are many close dependencies between authors, editors, reviewers, publishers, and the readership. In other words, these actors form a virtual community, in the sense of it being a union between

individuals or organizations who share common values and interests using electronic media to communicate within a shared semantic space on a regular basis (Schubert and Ginsburg, 2000).

For electronic scholarly communication in virtual communities to become successful, it is not a matter of merely installing some tools, and waiting for initiatives to happen. A virtual community is a socio-technical system (Preece, 2000). Well-designed socio-technical systems can provide communities with the energy necessary for healthy social development, as well as technical effectiveness (Shneiderman, 2002). Virtual communities which focus on scholarly communication in the form of e-journal publication are prime examples of socio-technical systems (Kling and Covi, 1995). Their Internet technologies continuously have to be carefully calibrated with the social infrastructure of scholarship, taking into account how the nature of the publication process is changed, both in terms of the social structure and the underlying dynamics of knowledge itself (Kling and Covi, 1995; Gaines, 1996). Understanding online community dynamics therefore requires studying the socio-technical *evolution* of virtual communities: what are its natural stages, what constructs are its building blocks, how do structure and behaviour of the community evolve over time, what drivers and obstacles of change are there, and who is to be involved in their governance?

In this paper, we outline a diagnostic approach for online community dynamics applied to a case of a a successful online law-journal: the Electronic Journal of Comparative Law (EJCL)[2]. First, we frame a conceptual model of the dynamics of virtual communities in Sect. 2. At the heart of this model are the composition norms governing the development of these socio-technical systems. In Sect. 3, we apply this theoretical lens by performing a longitudinal analysis of the development of EJCL. We first describe some actual change processes that took place in the socio-technical system of the EJCL community in the first six years of its existence, as well as the norms that governed these change processes. We then propose a formalization of the analysis of community dynamics in Sect. 4. We end with conclusions and directions for future research.

## 2. Online Community Dynamics

Socio-technical systems development in communities is not a one-time event, but a continuous process. Many community evolution models distinguish some sort of life cycle of birth, maturity, and death of a community, e.g. (McDermott, 2000; Wenger et al., 2002). Gongla and Rizutto (2001) distinguish five stages in community evolution: (1) a *potential* stage, in which initial connections are developed; (2) a *building stage*, for context and community memory creation; (3) an *engaged stage*, which focuses on access to one another and community learning; (4) an *active stage*, in which serious collaboration starts; and (5) an *adaptive stage*, for innovation and generation. Like the life cycle models, Gongla and Rizzuto recognize formative and growth stages of development. However, they see their evolution model not as a life-cycle approach, as a community can mature and dissolve at any one of these stages beyond the initial formation level.

2 http://www.ejcl.org/

Despite their differences in evolutionary flavour, all of these models prescribe changes in combinations of people, process, and technologies in various stages for healthy community development. However, these models have an important limitation: they offer only *generic* patterns for virtual community change, as if all communities develop along similar lines. Communities, however, are not homogenuous and identical, but have very different criteria, preferences, priorities, and development paths (Chambers, 1997). It is not a priori knoweable what the successful combinations of people, processes, and technologies are, as they are often unique to each community. Therefore, before each change to the socio-technical system, a careful analysis is required of the match between social structure and technological infrastructure, to prevent the emergence of socio-technical gaps (Ackerman, 2000). The performers of this analysis need to be the community members themselves, to ensure that the information systems composed out of the technologies (continue to) match actual community needs. In such a process of community-centered information systems development, community members continuously redefine their own socio-technical system (Preece, 2000). Thus, although life cycle models can give a valuable input into the main kinds of aspects to be taken into account in a particular stage of community evolution, they lack a systematic capability for the analysis and comparison of the *self*-governance processes of *particular* virtual communities.

Self-governance is key to communities, meaning that their change processes are governed by their own, communal norms instead of by legalistic rules (HLS, 1999). However, such norms can easily be jeopardized by the ephemeral nature and rapidly expanding membership of many Internet-based communities, including online journals. Therefore, making these norms explicit is important, even more so than in physical communities. Self-governance in communities should work best when they are mature and have developed sophisticated norms. On the other hand, permitting self-governance at an early stage may give communities the freedom and autonomy needed to establish these advanced norms (HLS, 1999). Thus, there is a tension between on the one hand the need for detailed norms guiding community operations and development, and, on the other hand, the need for these norms to develop over time. The question now becomes: how to capture and use the *evolving* community norms that are so important in building virtual communities like those embedding online journals? In (De Moor and Jeusfeld, 2001), we explained how to conceptualize this governance process through *composition norms*, which define acceptable change behaviour of community members.

## Composition Norms

Norms, social constructs that define acceptable behaviour, are a key element in any community. They define which workflow and evolutionary behaviour may, must, or may not be performed. Communities use norms of behaviour (or policies) to guide the interactions of community members, for example in the form of tacit assumptions, rituals, protocols, rules, and laws (Lessig, 1999; Preece, 2000). Norms are powerful regulatory constructs in communities, especially as these are not governed by traditional organizational hierarchies. Furthermore, communities are in constant flux, making static formal procedures often insufficient for the coordination of collaborative activities.

Norms can be classified according to their deontic effect, i.e. whether some actor may, must, or may not do a particular behaviour. The respective norms are called *privileges*, *responsibilities*, and *prohibitions*. Another classification is according to the process role the norms play in the socio-technical system: action norms and composition norms (De Moor and Jeusfeld, 2001). *Action norms* are norms that define acceptable operational (workflow) behaviour. For instance, in an electronic journal community, one action norm could be that an author may submit a paper (a privilege), whereas an editor must decide on its acceptance (responsibility). Furthermore, an author may not review her own paper (prohibition). *Composition norms*, on the other hand, are meta-norms that govern who should be involved in *changes* to the socio-technical system. For example, an author may suggest *changes* to the editorial workflow (privilege), the editor must make detailed proposals on the revisions of this workflow (responsibility), whereas the editorial board must make a final decision on whether this workflow change proposal is acceptable (responsibility). Insight into the evolution and application of these composition norms is key to a systematic analysis of community dynamics of *specific* communities. By analyzing many communities, of different types and in different domains, it should be possible to find out what change patterns are variable, and which ones are invariant. Once these insights have been obtained, much more specific change recommendations can be given, once the type and domain of community being advised is known.

Where to start? If every community is different, we cannot just use the high-level theoretical models described above. An alternative approach, is to analyze case after actual case, and to capture the composition norms *as emerging* in change management by members of real, successful virtual communities. Such an inductive approach is an example of applying a pattern-matching logic, which compares an empirically based pattern with a predicted one. If a new (normative) pattern does not match the previous ones, the theory (in this case norms predicting successful governance of particular people-process-technology combinations) can be refined, leading to theoretical replication across cases (Yin, 1994). In this way, an increasingly accurate knowledge base of composition norms can be built that can be used to select best practice governance practices in future cases, depending on the characteristics of the virtual community being studied.

In order to distill composition norms that are useful in practice, as participant observers, we did a longitudinal analysis of the evolution of the Electronic Journal of Comparative Law.

## 3. A Case: The Electronic Journal of Comparative Law (EJCL)

In this section, we summarize the community dynamics of the EJCL. The source of the lessons are interviews with key project members and documents such as minutes of board meetings and project reports, e.g. (Roes, 1998; Bol et al., 1998).

## 3.1. The Stages

The development of EJCL in 1997-2003 consisted of four distinct *stages*:

1 **Setup**: Construction of initial system by the project team with representatives of stakeholders (law librarians, comparative legal scholars and IT specialists).
2 **Launch**: Promotion of the web site via conferences (printed brochures, oral presentations), mailing lists, and personal contacts.
3 **Internal Growth**: Increasing readership, articles, and issues.
4 **External Growth**: (a) Building up own network of contacts directly interested in the journal, (b) establishing connections with related initiatives through links and cooperation.

The first stage forms the *project* stage. The objective was to create a comparative law e-journal with an international editorial board. A project team, consisting of staff from Tilburg University and Utrecht University libraries, computer centres and law faculties was put together. The legal scholars within the project team acted as a preliminary editorial board. During this stage, two actors coordinated the definition of the socio-technical system: the project manager and the future editor-in-chief. A detailed overview of their roles can be found in (Roes, 1998; Smets, 2002). The dynamics in terms of socio-technical changes the composition norms governing this stage have been documented in detail in (De Moor and Jeusfeld, 2001).

The final three stages comprise the *process* stage, in which the journal has been operational. Relatively few changes to the socio-technical system were needed in this stage.The consensus among review team members is that this is a result of the attention paid to the publishing model and the lessons learnt in other journals in the project stage. The main change concerned that it was no longer feasible to submit all articles to the full editorial board for review, because of the growing number of submissions. Instead, editors are only sent articles that are within their specific fields of expertise or interest. Articles that are not declined not only are sent to one or two specialist editors, but also are immediately put on a secure web-based file management server. The  server is used to give all members direct access to any article under review, both for their information and for being able to make comments if they consider that useful.

Based on these findings, we distilled some change management practices that turned out to be useful in this case.

## 3.2. Change Management in EJCL

Change is a costly process. Proper procedures are essential in making change processes effective and efficient. Following are some key change management practices as they were observed in the EJCL case.

### Project stage

- The EJCL had one clear goal (setting up EJCL) that everybody in the project phase understood. All the actors in the project phase worked really well together as a team towards that one goal.

- Socio-technical requirements were elaborately analysed by the project team at the very beginning of the ECJL. The initial workflows and the website of the EJCL were based on key functionalities of other electronic journals.
- There was a considerable variation in the degree and kind of involvement of the various actors, such as project team leader, scholars, librarians, technical experts, and consultants. For example, whereas in the beginning everybody was involved in all decisions, later on, for efficiency reasons, key technologies were mostly proposed and evaluated by technical experts and the project leader only.

### Process stage

- The success of the EJCL is "hard to imagine without human interaction" according to the editor-in-chief. The assistant editor, the advisor to the board, the editor-in-chief, and one Dutch editor therefore review the EJCL once or twice a year in an informal, face-to-face meeting.
- All change decisions in relation to the EJCL must be worked out and proposed unanimously by the review team to the editorial board. The (international) editorial board always has the right to change or even overrule those proposals.
- Everybody else is allowed to make suggestions for changes. All suggestions are taken into account during review sessions held by the review team. Without complaints, the changes proposed by the review team will be carried out, otherwise a person from the review team will discuss the problem with its owner to find a solution.
- Some of the project phase members are still involved in the process phase. The assistant editor is the same person, the advisor to the board was the project coordinator, and the editor in chief was a member of the project team. This organizational memory is considered to be very important, as much rationale for (not) making changes is tacit knowledge which has not been externalized.

As the EJCL case shows, the development of an e-journal requires a *continuous evolution* of its socio-technical system. In the various stages of development, a wide variety of socio-technical changes is needed. Most changes in e-journal development concern *generic* issues, but solutions are *specific* and unique. For example, all e-journals need to address the issue of citations. However, in law communities, citations often occur in the form of footnotes at the bottom of each page, whereas information science (IS) journals, for instance, much more often use references at the end of the article. Likewise, most law journals (but not EJCL!) use an open review process, while most IS – and EJCL – use a double-blind review process.

Like the solutions, the composition norms themselves are also specific to the community, as can be seen from the different change management patterns in the two stages. Still, there are many more instances of change than there are norms, as each norm can cover many possible changes. As demonstrated by the case, a relatively small – yet unique - set of norms can govern a wide range of evolutionary behaviours. The composition norms thus in fact act as change *patterns*, which are concise constructs helpful in governing complex socio-technical systems change (Thomas et al., 2002). Yet, how to formalize the

composition norms in a pattern language? How to distill successful change management patterns and make them available and customize them to other cases? We need some formal instrument for the representation of composition norms and the diagnosis of governance in virtual communities.

# 4. Formalizing the Analysis of Online Community Dynamics

Our concept of composition norms is based on the idea of seeing workflow modelling as a form of process composition, through which users circumscribe rather than exhaustively describe their socio-technical system (Fitzpatrick and Welsh, 1995). Composition norms indicate what members of the community need to be involved in which part of the change process that deals with a specific type of change event (or any of its subtypes). For instance, one composition norm could say that editors must be involved in any modification of any workflow. If somebody proposes a change to a review workflow (i.e. a subtype of any workflow), then this norm applies. Ensuring that all change processes at any time are covered by at least one composition norm can help making modifications to the socio-technical infrastructure legitimate. Such legitimacy is essential for healthy e-journals (Kling et Covi, 1995), and, by extension, other types of online communities of practice.

To represent and reason about composition norms, we use the formal approach developed in the RENISYS specification method for the legitimate user-driven specification of community information systems (De Moor and Jeusfeld, 2001). In RENISYS, four types of specification knowledge are distinguished: *type definitions* are used to define the ontology of socio-technical and change concepts; *state definitions* represent states-of-affairs, such as who is the current editor; *action norms* define acceptable workflow behavior, and *composition norms* represent acceptable change behavior. To represent these types of knowledge, we apply conceptual graph theory (Sowa, 1984). Conceptual graphs (CGs) are a system of logic based on the existential graphs of Charles Sanders Peirce and the semantic networks of artificial intelligence. They express meaning in a form that is logically precise, humanly readable, and computationally tractable. A powerful feature of conceptual graphs is that generalization hierarchies of graphs can be generated. Based on these hierarchies, it can be easily checked (by projection) whether one graph is a specialization of another one. How exactly to perform these operations was discussed in (De Moor and Jeusfeld, 2001), here we focus on their application. Key is that using norms of different *specificity*, norms can be defined at exactly the level of detail required in a community. For example, in law journals, workflow-related norms must be defined in great detail (e.g. the editor must evaluate any change to the review process), as the reputation of the journal depends on them, while norms governing the technologies used can be defined at a higher level of abstraction (e.g. all changes to tools supporting some workflow may be done by any community member) .

## 4.1. A Method for Community Dynamics Analysis

In this paper, we only outline our method for community dynamics analysis. It is built around the idea of composition norms as the constructs that define the desired self-governance process (stages) of a particular virtual community. More detailed descriptions of the method can be found in the papers mentioned in the previous section.

1. *Type definitions are made of all concepts*.

These definitions essentially define a concept in terms of its supertype. All concept type definitions together form an implicit type hierarchy. For example, in the EJCL-case direct subtypes of the concept Actors include Editors and Project Coordinators, while an Assistant-Editor in turn is a direct subtype of Editor. These concept types are used in the definition of the composition norms.

2. *Represent all composition norms that govern the community in its development*

Each composition norm is a specialization of the following generic pattern (in conceptual graph notation):

```
[Norm Category:  [Actor] ← (Agnt) -
      [Control] → (Obj) → [Specify] → (Rslt) -
            [Definition]].
```

The norm category is either a permitted, required, or forbidden composition. The pattern should be read as that some type of actor is permitted/required/prohibited to control (initiate/execute/evaluate) a specification change process (creation/modification/termination) of some definition (type/state/action norm/composition norm). Some norms will be very generic, others very specific. Often, many norms apply simultaneously, sometimes with contradicting *deontic effects.* This can lead to norm conflicts, for example, when in a particular change event, both a privilege and a prohibition apply. In (De Moor and Jeusfeld, 2001), we show how such norm conflicts can be resolved by prioritizing one norm category over another.

In the EJCL case, we reconstructed the composition norms that have governed the community over the first six years of its existence. Space does not permit us to show them all here, see (De Moor and Jeusfeld, 2001; Smets, 2002) for a partial overview. An interesting finding was that, contrary to common belief (i.e. HLS, 1999), more *specific* rather than generic norms governed its development in the *initial* project-stage of its development. For example, one of the norms that governed the project stage was the following:

```
[Req_Comp:  [Project_Coord] ← (Agnt) -
      [Eval] → (Obj) → [Specify] → (Rslt) -
            [Type : [Support]]].
```

This norm says that a responsibility of the project coordinator was to evaluate all changes of *support*-definitions (those definitions that concern which information tools support what workflows). In the subsequent *process* stage, however, only a few, more generic norms applied, like the following:

```
[Req_Comp:  [Review_Team] ← (Agnt) ←
      [Control] → (Obj) → [Specify] → (Rslt) →
            [Definition]].
```

This – more generic – norm represents that it is a responsibility of the review team to control *all* change processes. To guarantee checks and balances, the editorial board in addition always has the right (i.e. privilege) to evaluate whatever the review team decides:

```
[Perm_Comp:  [Editorial_Board] ← (Agnt) -
      [Eval] → (Obj) → [Specify] → (Rslt) -
            [Definition]].
```

3. *Use the composition norms to analyze the actual/predicted evolution of the virtual community.*

Based on the developed conceptual framework, there are many opportunities for analysis and improvement of community dynamics:

- One application concerns the legitimacy analysis of actual change events. By discovering mismatches between how change processes actually happened ("IST") and relevant composition norms ("SOLL"), governance problems can be identified. Then, a more qualitative analysis may lead to revisions in either the work practices or the norms that govern them. In the EJCL case, for instance, in the beginning of the project stage everybody was involved in evaluating detailed proposed changes to the information tools used. This change norm, however, was quickly replaced by having only the project coordinator checking initial proposals, as law professors did not want to be bothered by technical details.
- Another potential application of composition norm analysis is querying existing composition norm knowledge bases. Applicable composition norms from successful e-journals can be retrieved based on the evolution stage to which they apply and the specific part of the socio-technical system to be changed. Query graphs can be projected on a large database of composition norms, easily retrieving useful patterns. For example, say that a journal editor is setting up a new journal, and wants to know in what ways the editor-role should be involved in the lifecycle of his journal. The following query graph would retrieve all composition norms in which editors (or subtypes like assistant-editors) are to be involved in the evaluation of any specification changes to a successful journal like EJCL[4]:

  ```
  [Comp_Norm:  [Editor] ← (Agnt) -
        [Eval] → (Obj) → [Specify] → (Rslt) -
              [Definition]]?
  ```

- A third application is doing cross-case analyses of the composition norms that were used in different e-journal communities. Similarities and differences in normative patterns can be used in distilling best practices and developing

4 Of course, the user, say an editor-in-chief, never would see these abstract graphs, as they just represent the internal logic of a knowledge base made accessible through a more user-friendly interface.

reference models to be used in high-quality best-of-class e-journal development. Developing and using such best-practices knowledge bases is increasingly a critical success factor in quality control (Foster, 2001).

## 5. Discussion and Conclusions

E-journals are increasingly important collaborative instruments for the creation and validation of legal knowledge research. To be succesful, these e-journals need to be embedded in healthy virtual communities. A key characteristic of virtual communities is that, as complex socio-technical systems, they are continuously evolving. This evolutionary process is guided by subtle change norms, which we call composition norms. Composition norms emerge from the community as it matures. So far, little is known about the similaraties and differences in governance patterns of different (types of) virtual communities. Of course, besides norms, other critical success factors, like the availability of resources like time or funding, are needed. Still, we see insight in the norms as one of the necessary conditions for successful community evolution.

The first purpose of this article was to examine community dynamics in practice, by focusing on the self-governance patterns developing over time in a community. We summarized a longitudinal analysis of the change processes and composition norms that emerged in a successful electronic law journal: the Electronic Journal of Comparative Law (EJCL). E-journals are good examples of professional online communities, and we believe the lessons learnt here apply to a wider range of communities, such as software development and open source communities.

A second goal was to learn about how to generalize these change lessons learnt, and make them available to other online community development efforts. To this purpose, we presented a diagnostic instrument for detecting self-governance patterns in online communities of practice. The formalism underlying this instrument is conceptual graph theory. The power of conceptual graphs is that they can capture complex change management knowledge at different levels of specificity, and allow complex queries to be easily made using projection. In this way, formal representation is applied where it is useful: to select who to involve in resolving the many subtle tacit knowledge issues involved in e-journal dynamics, not to try and capture the total complexity of the world in a formal model. Several applications of this diagnostic instrument were described: legitimacy analysis of change events, querying composition norms to find useful governance patterns, and developing reference models for cross-case best practices governance.

An interesting finding is the importance of physical meetings in EJCL. By analyzing its dynamics we found that, although, basically all operational tasks are done online, to deal with *changes* in its socio-technical system, physical interactions, such as face-to-face meetings, remain important. It is often said that online communities require face-to-face meetings to start-up and revive energy. We conjecture that in fact, one of the main function of these meetings could be to (re)define the composition norms of the community. We further hypothesize that once adequate community typologies and reference models of composition norms become available, less face-to-face interactions may be needed for these purposes, and that (completely) online communities may become more successful. This, we believe, is the key contribution of such an approach. Admitted, it is costly and not very useful until many norms have been gathered and userfriendly interfaces have

been developed. Once these are available, however, these explicit governance patterns can help reconstruct some of the change management qualities of subtle human interactions.

We plan to do similar composition norm reconstruction in other e-journals, in research domains such as healthcare and biology. We are very interested in finding out if the findings of EJCL are generalisable. Do other comparative law journals have similar development patterns? What about other law journals? IS journals? Research journals in general? At which evolutionary stage and level of specificity should socio-technical changes be introduced? In EJCL, almost all conceptual development took place in the project stage. Findings, however, suggest that in other journal communities much more may need to be done in the process stage (Smets, 2002). Also, more refined stage-analysis needs to be done, as currently we have only distinguished between the project and process stage. Community evolution models as presented in (McDermott, 2001; Gongla and Rizzuto, 2001; Wenger et al., 2002) could provide useful templates. Furthermore, doing composition norm analysis in other domains than e-journals may prove instructive, as was shown by a related case analysis of e-healthcare network governance (De Moor and Peterson, 2001).

Our diagnostic instrument for community dynamics has proven to be successful in modeling actual online community change management and coming up with suggestions for improvement of community dynamics. However, researcher intervention in its use is still required, as there is no user-friendly shell around the conceptual graphs tool. We are planning to create such a (Web-based) interface. Having user-friendly access to composition norm knowledge bases could jump start other online community development projects, preventing many of the considerable start-up and learning costs of the pioneers (Bot et al, 1998). Work breakdowns still need to be dealt with as they occur in the various phases, but at least the norms will be there to guide the communities in finding the people to deal with them. More generally, such systematic self-governance analytical support could prove crucial not only for e-journal communities, but any professional online community, like those in e-business that help to overcome difficult barriers such as lack of trust.

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